## Core Content

| **Cluster Title: Represent and solve equations and inequalities graphically.** |
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| **Standard A.REI.10:** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). |
| **Concepts and Skills to Master** |
| • Identify solutions and non-solutions of linear and exponential equations.<br>• Graph points that satisfy linear and exponential equations.<br>• Understand that a continuous curve or a line contains an infinite number of solutions. |

## Supports for Teachers

| **Critical Background Knowledge** | |
|---|---|
| • Understand the concept of and be able to plot ordered pairs.<br>• Evaluate expressions for given values. | |
| **Academic Vocabulary** | |
| Ordered pair, coordinate plane, solution, non-solution, sets | |
| **Suggested Instructional Strategies** | **Resources** |
| • Create a matching game where students match equations, graphs of equations, and solutions. | *Making it Happen* (NCTM) |
| **Sample Formative Assessment Tasks** | |
| **Skill-based Task**<br>• Given a graph of the equation $x+3y=6$, find three solutions that will satisfy the equation.<br>• Given a graph representing the growth of a savings account over time with a given rate of return, determine the value of the account after 3 years, 5 years, 10 years, 12 years and 6 months. | **Problem Task**<br><br>Find all possible solutions to $3x+2y=6$. |

# Core Content

| **Cluster Title: Represent and solve equations and inequalities graphically.** |
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| **Standard A.REI.11:** Explain why the *x*-coordinates of the points where the graphs of the equations *y = f(x)* and *y = g(x)* intersect are the solutions of the equation *f(x) = g(x)*; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where *f(x)* and/or *g(x)* are linear, ~~polynomial, rational, absolute value,~~ or exponential~~, and logarithmic functions~~.★ |
| **Concepts and Skills to Master** |
| • Approximate solutions to systems of two equations using graphing technology.<br>• Approximate solutions to systems of two equations using tables of values.<br>• Explain why the *x*-coordinates of the points where the graphs of the equations *y = f(x)* and *y = g(x)* intersect are the solutions of the equation *f(x) = g(x).*<br>• Be able to express that when f(x) = g(x), the two equations have the same solution(s). |

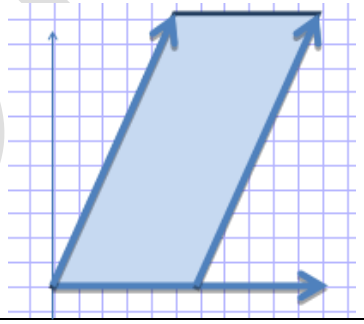
# Supports for Teachers

| **Critical Background Knowledge** | |
|---|---|
| • Evaluate expressions.<br>• Construct a table of values for a given function.<br>• Graph functions using graphing technology. | |
| **Academic Vocabulary** | |
| Function, intersection, approximate, linear, exponential, *f(x), g(x)*. | |
| **Suggested Instructional Strategies** | **Resources** |
| • Use graphing technology to approximate the point(s) of intersection of two graphs.<br>• Make comparisons between tables of values. | www.illuminations.NCTM.org<br>• Supply and Demand |
| **Sample Formative Assessment Tasks** | |
| **Skill-based Task**<br>Use technology to graph and compare a beginning salary of $30 per day increased by $5 each day and a beginning salary of $0.01 per day, which doubles each day. When are the salaries equal? How do you know? | **Problem Task**<br>Explain why a company has to sell 100 soccer balls before they will make a profit. The cost of producing a soccer ball is modeled by C = 10*x* + 1000. The sales price of a soccer ball is $20. |

# Core Content

| **Cluster Title: Represent and solve equations and inequalities graphically.** |
|---|
| **Standard A.REI.12:** Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. |
| **Concepts and Skills to Master** |
| • Graph the solution to linear inequalities in two variables.<br>• Graph the solution to systems of linear inequalities in two variables.<br>• Identify the solutions as a region of the plane. |

# Supports for Teachers

| **Critical Background Knowledge** | |
|---|---|
| • Graph linear equations.<br>• Graph systems of linear equations.<br>• Simplify inequalities to represent them in a format that is easy to graph. | |
| **Academic Vocabulary** | |
| Inequality, solution, half-plane, solution region | |
| **Suggested Instructional Strategies** | **Resources** |
| • Use technology to model examples of intersections of inequalities.<br>• Use colored pencils to find the region of solutions. | www.shodor.org |
| **Sample Formative Assessment Tasks** | |
| **Skill-based Task**<br><br>Graph the solution set of<br>$x + 2y > 12$ and $3x - y < 9$ | **Problem Task**<br>  <br>Create a context that represents the shaded area. Write the system of inequalities that models the meaning of the context. Describe the connections between the context, inequalities, and graph. |